

1. (Amended) Apparatus for processing multiple semiconductor wafers, the apparatus comprising:

a transfer chamber;

a first processing chamber mounted in fixed relation to the transfer chamber and having a first wafer-holding platform with a center;

B1 a second processing chamber mounted in adjustable relation to the transfer chamber and to the first chamber and having a second wafer-holding platform with a center, wherein the first and second processing chambers are disposed on a common side of the transfer chamber; and

a robot rotatably mounted within the transfer chamber and having first and second wafer-holding arms configured parallel to each other for inserting a pair of wafers simultaneously into the first and second chambers and for placing the wafers accurately centered over the respective platforms, the second chamber is adjustable relative to the robot arms such that the wafers are centered and placed with a preselected degree of accuracy onto the respective platforms for efficient processing of the wafers.

2. The apparatus of claim 1 wherein the first and second chambers are closely spaced self-contained units supported in cantilever fashion from a wall of the transfer chamber, the chambers and the platforms being adapted to simultaneously process wafers using edge purging.

3. (Amended) Apparatus for processing multiple semiconductor wafers, the apparatus comprising:

a transfer chamber;

B2 a first processing chamber mounted in known relation to the transfer chamber and having a first wafer-holding platform with a center;

a second processing chamber having a second wafer-holding platform with a center, wherein the first and second processing chambers are disposed on a common side of the transfer chamber;

a mechanism for adjustably mounting the second chamber in relation to the first chamber and to the transfer chamber, the mechanism providing a plurality of position adjustments for the second chamber; and

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a robot rotatably mounted within the transfer chamber and having first and second wafer-holding arms configured parallel to each other for inserting a pair of wafers simultaneously into the first and second chambers and for placing the wafers accurately centered over the respective platforms, the second chamber is adjustable relative to the robot arms such that the wafers are centered and placed with a preselected degree of accuracy onto the respective platforms for efficient processing of the wafers.

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4. The apparatus of claim 3 wherein the mechanism comprises a bellows assembly positioned between the transfer chamber and the second chamber and providing for relative movement and also a wafer passageway between the chambers while maintaining an hermetic seal.

5. The apparatus of claim 3 wherein the mechanism comprises:  
a first plate fastened to a wall of the transfer chamber;  
a second plate fastened to a wall of the second chamber;  
a bellows assembly sealed between the plates and providing for relative movement between the plates and an hermetically sealed wafer passageway between the chambers; and  
means for securing the relative positions of the plates once adjustments thereto have been effected.

6. The mechanism of claim 5 wherein the first and second plates are hinged together along a bearing line such that position adjustments thereto can be made in "X", "Y" and "Z" directions.

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7. (Amended) Apparatus for processing at least two semiconductor wafers simultaneously, the apparatus comprising:

a transfer chamber;  
a load-lock chamber adjacent the transfer chamber; *h247*  
a first processing chamber mounted in known relation to the transfer chamber  
and having a first wafer-holding platform with a center;

a second processing chamber having a second wafer-holding platform with a  
center, wherein the first and second processing chambers are disposed on a common  
side of the transfer chamber;

adjusting means for adjustably mounting the second chamber in relation to the  
first chamber and to the transfer chamber, the adjusting means having a bellows  
assembly positioned between the transfer chamber and the second chamber and  
providing for relative movement thereof and also providing a wafer passageway  
between the chambers while maintaining an hermetic seal; and

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*W*  
a robot rotatably mounted around a center axis within the transfer chamber and  
having first and second wafer-holding arms configured parallel to each other for  
withdrawing a pair of wafers from the load-lock chamber and inserting the pair of wafers  
simultaneously into the first and second chambers and for positioning both of the wafers  
with a preselected degree of accuracy over the respective platforms, the second  
chamber is adjustable relative to the robot arms and the center axis such that the  
wafers are centered and placed with the preselected degree of accuracy onto the  
respective platforms for efficient processing of the wafers.

8. The apparatus of claim 7 further comprising additional processing chambers  
corresponding respectively to the first and second chamber, the additional chambers  
being mounted relative to the load-lock chamber in ways respectively like those of the  
first and second chambers.

9. (Amended) Apparatus for processing a pair of semiconductor wafers  
simultaneously, the apparatus comprising:

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a transfer chamber;  
a load-lock chamber adjacent the transfer chamber;

a first processing chamber mounted in fixed relation to the transfer chamber and having a first wafer-holding platform with a center;

a second processing chamber having a second wafer-holding platform with a center, wherein the first and second processing chambers are disposed on a common side of the transfer chamber;

mechanical means for adjustably mounting the second chamber in relation to the first chamber and to the transfer chamber; the mechanical means supporting the second chamber against the transfer chamber in cantilever fashion and having a bellows assembly positioned between the transfer chamber and the second chamber to provide for relative movement thereof and to provide a wafer passageway between the respective chambers while maintaining an hermetic seal;

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a slit valve adjacent the passageway for hermetically sealing the transfer chamber from the second chamber; and

a remotely controlled robot rotatably mounted around a center axis within the transfer chamber and having first and second wafer-holding arms configured parallel to each other for withdrawing a pair of wafers from the load-lock chamber and inserting the pair of wafers simultaneously into the first and second chambers and for positioning both of the wafers to a preselected degree of accuracy over the respective platforms, the second chamber is adjustable by the mechanical means relative to the robot arms and the center axis such that the wafers are centered and placed with the preselected degree of accuracy onto the respective platforms for efficient processing of the wafers.

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10. The apparatus of claim 9 wherein the mechanical means provides for adjusting the position of the second chamber in "X", "Y", and "Z" directions, and for thereafter rigidly fastening in place such position.

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11. (Amended) An apparatus for processing multiple semiconductor wafers, comprising:

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a transfer chamber;

at least one pair of processing chambers disposed about the transfer chamber, wherein each pair of processing chambers comprises:

a first processing chamber mounted in known relation to the transfer chamber;  
and

a second processing chamber adjustably mounted to the transfer chamber,  
wherein the first and second processing chambers are disposed on a common side of  
the transfer chamber;

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a mechanism for positioning the second processing chamber in relation to the  
first processing chamber and in relation to the transfer chamber; and

a robot mounted within the transfer chamber for inserting a pair of wafers  
simultaneously into the first and second processing chambers.

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12. The apparatus of claim 11, wherein the second chamber is adjustable relative to the robot such that the wafers are centered and placed within a preselected degree of accuracy within the first and the second processing chambers.

13. The apparatus of claim 11, wherein the mechanism comprises a bellows assembly disposed between a first plate and a second plate.

14. The apparatus of claim 11, wherein the first plate is connectable to a side wall of the transfer chamber and the second plate is connectable to a side wall of the second chamber.

15. The apparatus of claim 14, wherein the bellows assembly allows a spacial relationship of the sidewalls of the transfer chamber and the second chamber to be adjusted thereby positioning a wafer platform within the second chamber in alignment with a wafer platform within the first chamber.

16. The apparatus of claim 15, wherein the robot accurately centers the wafers over the respective platforms when the second chamber is adjusted in relation to the transfer chamber and the first chamber.

17. (Amended) An apparatus for processing multiple semiconductor wafers, comprising:

a transfer chamber;

at least one pair of processing chambers disposed about a common side of the transfer chamber, wherein each pair of processing chambers comprises:

36 a first processing chamber disposed in known relation about the transfer chamber;

a second processing chamber adjustably disposed about the transfer chamber; and

a bellows assembly disposed between the second processing chamber and the transfer chamber; and

a robot mounted within the transfer chamber adapted to insert a pair of wafers simultaneously into the first and second processing chambers.

18. The apparatus of claim 17, wherein the bellows assembly allows the second processing chamber to be positioned in relation to the first processing chamber and in relation to the transfer chamber.

19. The apparatus of claim 17, wherein the bellows assembly provides an hermetically sealed wafer passageway between the second processing chamber and the transfer chamber.

20. The apparatus of claim 17, wherein the bellows assembly allows angular and longitudinal coordinates of a center of a platform within the second chamber to be aligned with angular and longitudinal coordinates of a center of a platform within the first chamber.

21. The apparatus of claim 17, wherein the robot is rotatable within the transfer chamber so that the pairs of wafers can be inserted into or withdrawn from the at least one pair of processing chambers.

22. The apparatus of claim 17, wherein the robot includes at least one pair of spaced apart and vertically aligned arms.

23. The apparatus of claim 22, wherein the robot arms are extendable along respective longitudinal, parallel axes.

24. (Amended) An apparatus for processing multiple semiconductor wafers, comprising:

a transfer chamber;

at least one pair of processing chambers disposed about a common side of the transfer chamber, wherein each pair of processing chambers comprises:

a first processing chamber disposed in known relation about the transfer chamber;

a second processing chamber adjustably disposed about the transfer chamber; and

a bellows assembly disposed between the second processing chamber and the transfer chamber; and

a robot having horizontal arms and mounted within the transfer chamber for inserting a pair of wafers simultaneously into the first and second processing chambers, the robot having at least two arms extendable along respective longitudinal, parallel axes.